

THE MECHANISMS OF USING MATHEMATICAL STATISTICAL
ANALYSIS METHODS IN PSYCHOLOGY

Tursunbek Sadriddinovich Jalolov

Asia International University

ts_jalolov@oxu.uz

Abstract: The use of mathematical statistical analysis methods in psychology has significantly contributed to the understanding and advancement of various psychological phenomena. This article provides an overview of the mechanisms through which mathematical statistical analysis is employed in psychological research. Understanding these mechanisms is crucial for psychologists to effectively utilize statistical methods in their research and data analysis. The article explores the importance of statistical methods in psychology, the various statistical techniques employed, and their role in data interpretation and decision-making.

Keywords: Mathematical statistical analysis, Psychology, Research, Data analysis, Statistical techniques

Mathematical statistical analysis methods play a pivotal role in psychological research, as they enable researchers to derive meaningful insights from data and make informed decisions. By employing various statistical techniques, psychologists can analyze complex data sets, identify patterns, and draw conclusions that contribute to the advancement of psychological knowledge. This article aims to elucidate the mechanisms through which mathematical statistical analysis methods are utilized in psychology and their importance in enhancing the rigor and validity of psychological research.

The field of psychology has greatly benefited from the use of mathematical statistical analysis methods in understanding and interpreting data. These methods provide psychologists with powerful tools to analyze and interpret data, and ultimately gain insights into human behavior and mental processes. In this article, we will explore some of the mechanisms of using mathematical statistical analysis methods in psychology and how they contribute to the advancement of the field.

One of the key mechanisms of using mathematical statistical analysis in psychology is to identify patterns and relationships within data. This is achieved through techniques such as correlation analysis, regression analysis, and factor analysis, which allow researchers to uncover the underlying relationships between different variables. For example, psychologists may use correlation analysis to examine the relationship between two variables, such as stress and performance in a

cognitive task, to determine if there is a significant relationship between the two factors.

Another mechanism is to test hypotheses and make inferences from the data. Statistical tests, such as t-tests, ANOVAs, and chi-square tests, are commonly used in psychology to test hypotheses and determine the significance of findings. These tests allow researchers to draw conclusions from their data and make inferences about the broader population based on their findings. For example, a psychologist may use a t-test to compare the mean scores of a treatment group and a control group to determine if there is a significant difference in the effectiveness of a particular intervention.

Furthermore, mathematical statistical analysis methods can also be used to explore the reliability and validity of psychological measures. Psychologists often rely on measures such as surveys, questionnaires, and psychological tests to assess various aspects of human behavior and mental processes. Through methods such as factor analysis, psychometric analysis, and reliability testing, researchers can assess the internal consistency, construct validity, and reliability of these measures, ensuring that they are robust and accurately capture the constructs they are intended to measure.

Methods of mathematical-statistical processing of psychological research

Before proceeding to the (quantitative) analysis and description of the data obtained from the research, it is necessary to summarize, systematize and bring them into a compact form. For this, it is necessary to know mathematical statistics and be able to work with them. Numbers that reflect the measurement of indicators are taken as options in statistics. All measurements, that is, measurements in ascending or descending order, form a variation series. The number of measurements corresponding to the variable series is called the frequency.

For example, the researcher asked, "Do your thoughts and views often agree with those of your classmates?" Let's say that 36 students responded to the survey question. There are 5 different answers: "always", "often", "sometimes", "rarely", "never". If a number is given for each 1 answer option ("always" - 5, "often" - 4, "sometimes" - 3, "rarely" - 2, "never" - 1)

And if it occupies a series in descending order of numbers, we divide it into a variational series as follows:

5555544444444443333333333322222211

We put the obtained data in the form of a table so that it is easy to process:

1.5. Requirements for conducting psychological research

1. It includes methods and methods that are not used in the organization of research, as well as testing (using pilotage). The number of subjects and the number of subjects examined in the study.

A research method is a way, a tool to obtain information of interest to the researcher.

Calculation methodology is a concrete method and set of possibilities for obtaining the necessary information about mental processes and safety factors.

2. the place of inspection should be free of various stones, and at the same time, it should meet sanitary and hygienic rules. Forced working conditions must be ensured.

3. The technical support of the research should correspond to the issues to be resolved.

4. It is necessary to mark the testers as having the same quality.

5. the researcher affects the progress of the research, the conduct of all its stages (from planning to the development of research and recommendations).

6. The instruction or instruction is drawn up before the research, at the preparatory stage. It should be clear, concise and unambiguous.

7. It must be completed in additional reports, and it must be attached to a support letter.

8. It is necessary to analyze the quality and strength of the data obtained from the research, to produce, that is, to process.

Requirements for psychodiagnostic methods:

It is necessary to change the psychodiagnostic method according to the criteria that indicate the previous growth and stability. Reliability of psychodiagnostic methods is the quality of psychodiagnostic methods, which helps with the help of this method.

Reliability of the methodology is a criterion indicating controllability and reproducibility. A. Anastazi wrote that if a child's intelligence test for 10 weeks has an indicator equal to 10 weeks, and this indicator is equal to 80 in a week, it is impossible to look at such methodology with confidence. Re-runs of reliable methods should show a similar result. There may be small changes, but they should not be significant.

The degree of reliability of the methodology depends on a number of reasons. According to the results of the study, which reduces the accuracy of the research study, it can be determined:

- instability of the diagnosed quality;
- lack of improvement of diagnostic methods (instructional errors, practical variety of tasks, uncertainty in presenting the method to the examinee);

- timeliness of the research situation (changes at different times of the day, different lighting of the room, presence or absence of extraneous noises);
- the behavior of the experimenter, mastering the tone of speech (different instruction in one experiment, changing it in another; different stimulation of the IQ task);
- changes in physical condition (feeling good in one experiment, tiredness in another);
- subjectivity in interpreting and implementing the report.

One of the ways to standardize the reliability of psychodiagnostic methods, to develop uniform requirements for the procedure of carrying out the method and to eliminate its consequences. Another important criterion for starting a methodology is validity. Once the reliability is determined, the question of the validity of the methodology.

In addition, mathematical statistical analysis methods enable psychologists to analyze data from various research designs, such as experiments, observational studies, and longitudinal studies. These methods provide the tools to analyze complex data structures, identify trends over time, and examine the effects of multiple variables on a particular outcome. For example, psychologists may use multilevel modeling to analyze data with hierarchical structures, such as individual and group-level factors influencing behavior in a school setting.

Overall, the use of mathematical statistical analysis methods in psychology offers a systematic and rigorous approach to understanding and interpreting data, leading to a deeper understanding of human behavior and mental processes. These methods provide psychologists with the tools to identify patterns and relationships within data, test hypotheses, assess the reliability and validity of measures, and analyze data from various research designs. As the field of psychology continues to advance, the integration of mathematical statistical analysis methods will remain essential for generating valuable insights and advancing our understanding of human behavior.

The use of mathematical statistical analysis methods in psychology is instrumental in advancing the understanding of psychological phenomena. By employing various statistical techniques, psychologists can derive meaningful insights from data, make informed decisions, and contribute to the development of psychological knowledge. It is essential for psychologists to have a thorough understanding of statistical methods and their mechanisms to ensure the validity and reliability of research findings. Moving forward, continued emphasis on the integration of statistical analysis in psychological research is paramount for furthering the field and addressing complex psychological questions.

References

1. Jalolov, T. S. (2023). PSIXOLOGIYA YO 'NALISHIDA TAHSIL OLAYOTGAN TALABALARGA SPSS YORDAMIDA MATEMATIK USULLARNI O 'RGATISHNING METODIK USULLARI. Educational Research in Universal Sciences, 2(10), 323-326.
2. Jalolov, T. S. (2023). PYTHON INSTRUMENTLARI BILAN KATTA MA'LUMOTLARNI QAYTA ISHLASH. Educational Research in Universal Sciences, 2(10), 320-322.
3. Jalolov, T. S., & Usmonov, A. U. (2021). "AQLLI ISSIQXONA" BOSHQARISH TIZIMINI MODELLASHTIRISH VA TADQIQ QILISH. Экономика и социум, (9 (88)), 74-77.
4. Sadriddinovich, J. T. (2023). Capabilities of SPSS Software in High Volume Data Processing Testing. American Journal of Public Diplomacy and International Studies (2993-2157), 1(9), 82-86.
5. Sadriddinovich, J. T. (2023, November). IDENTIFYING THE POSITIVE EFFECTS OF PSYCHOLOGICAL AND SOCIAL WORK FACTORS BETWEEN INDIVIDUALS AND DEPARTMENTS THROUGH SPSS SOFTWARE. In INTERNATIONAL SCIENTIFIC RESEARCH CONFERENCE (Vol. 2, No. 18, pp. 150-153).
6. Jalolov, T. S. (2023). TEACHING THE BASICS OF PYTHON PROGRAMMING. International Multidisciplinary Journal for Research & Development, 10(11).
7. Jalolov, T. S. (2023). Solving Complex Problems in Python. American Journal of Language, Literacy and Learning in STEM Education (2993-2769), 1(9), 481-484.
8. Jalolov, T. S. (2023). PEDAGOGICAL-PSYCHOLOGICAL FOUNDATIONS OF DATA PROCESSING USING THE SPSS PROGRAM. INNOVATIVE DEVELOPMENTS AND RESEARCH IN EDUCATION, 2(23), 220-223.
9. Tursunbek Sadriddinovich Jalolov. (2023). ARTIFICIAL INTELLIGENCE PYTHON (PYTORCH). Oriental Journal of Academic and Multidisciplinary Research , 1(3), 123-126.
10. Jalolov, T. S. (2023). ADVANTAGES OF DJANGO FEMWORKER. International Multidisciplinary Journal for Research & Development, 10(12).
11. Jalolov, T. S. (2023). ARTIFICIAL INTELLIGENCE PYTHON (PYTORCH). Oriental Journal of Academic and Multidisciplinary Research, 1(3), 123-126.
12. Jalolov, T. S. (2023). SPSS YOKI IJTIMOIY FANLAR UCHUN STATISTIK PAKET BILAN PSIXOLOGIK MA'LUMOTLARNI QAYTA ISHLASH. Journal of Universal Science Research, 1(12), 207-215.
13. A.K.Кутбеддинов. (2023). УРАН САНОАТИ ТАЪСИРИ ХУДУДЛАРИДАГИ ТАБИЙ СУВЛАР РАДИАЦИОН КЎРСАТКИЧЛАРИНИНГ ЯДРО-ФИЗИК ТАДҚИҚ УСУЛЛАРИ. Journal of Universal Science Research, 1(12), 167-174.
14. Худжакулова, Ф. Р. (2023). ЎЗБЕКИСТОН ТАРАҚҚИЁТИНИНГ ЮКСАЛИШ БОСҚИЧИДА ЁШЛАРНИНГ ТАРБИЯСИДА ОИЛАНING АҲАМИЯТИ. Научный Фокус, 1(7), 266-270.
15. Худжакулова, Ф. Р. (2023). ЁШЛАРНИНГ КИТОБ МУТОЛААСИ ВА КИТОБХОНЛИК МАДАНИЯТИНИ ОШИРИШ ҲОЖИ-МАҲМУРИЙ ТАЪЛИМ-ТАРБИЯНИНГ САМАРАДОРЛИГИНИ ЮКСАЛТИРИШ ВОСИТАСИ. ОБРАЗОВАНИЕ НАУКА И ИННОВАЦИОННЫЕ ИДЕИ В МИРЕ, 21(5), 173-176.
16. Худжакулова, Ф. Р. (2022). МАКТАБГАЧА ЁШДАГИ БОЛАЛАР ВА БОШЛАҒИЧ ТАЪЛИМ МАКТАБ ЎҚУВЧИЛАРИНИНГ МИЛЛИЙ МАҲМУРИЙ ОНГИНИ ШАКЛЛАНТИРИШНИНГ ЎЗИГА ХОС ХУСУСИЯТЛАРИ. PEDAGOGS jurnali, 4(1), 267-272.
17. Khudjakulova, F. R. (2021). Ideological consciousness and its place in the system of social consciousness. ACADEMICIA: AN INTERNATIONAL MULTIDISCIPLINARY RESEARCH JOURNAL, 11(1), 904-908.

VOLUME-1, ISSUE-5

18. Хужакулова, Ф. Р. (2020). ФОРМИРОВАНИЕ НАЦИОНАЛЬНОГО ИДЕОЛОГИЧЕСКОГО СОЗНАНИЯ УЧЕНИКОВ. In European research: innovation in science, education and technology (pp. 80-82).
19. Хужакулова, Ф. Р. (2018). ТЕХНОЛОГИЯ ПОДГОТОВКИ БУДУЩИХ УЧИТЕЛЕЙ К ДУХОВНОМУ И ЭСТЕТИЧЕСКОМУ ОБРАЗОВАНИЮ. In INTERNATIONAL SCIENTIFIC REVIEW OF THE PROBLEMS OF PEDAGOGY AND PSYCHOLOGY (pp. 43-45).
20. Хуждакулова, Ф. Р. (2016). СУФИЗМ В КОНТЕКСТЕ ПРОБЛЕМЫ ВОСПИТАНИЯ ДУХОВНО РАЗВИТОЙ ЛИЧНОСТИ. Современные проблемы социально-гуманитарных наук, (2), 89-91.
21. Ikromova, S. (2023). INTERPRETATION OF THE PSYCHOLOGICAL SAFETY FACTOR IN RELATION TO DESTRUCTIVE INFORMATION IN ADOLESCENTS. Modern Science and Research, 2(9), 390-394.
22. Ikromova, S. (2023). CONCEPT OF IDEOLOGY AND FORMATION OF IDEOLOGICAL IMMUNITY IN YOUTH STUDENTS. Modern Science and Research, 2(6), 1223-1226.
23. Ikromova, S. (2023). FORMATION OF IDEOLOGICAL IMMUNITY TO DESTRUCTIVE INFORMATION IN TEENAGERS. Modern Science and Research, 2(5), 1009-1014.
24. Ikromova, S. A. (2022). MILLIY VA DINIY QADRIYATLARNING INSON TARBIYASIDAGI O'RNI. Экономика и социум, (12-2 (103)), 675-678.
25. Ikromova, S. A. (2023). SHAXS OG 'ISHGAN XULQINING KO 'RINISHLARI VA DESTRUKTIV AXBOROTLARNING KO 'RINISHLARI. Educational Research in Universal Sciences, 2(10), 528-532.
26. Akbarovna, I. S. (2023). YOSHLARDA DESTRUKTIV G'OYALARGA QARSHI IMMUNITET HOSIL QILISH OMILLARI.
27. Akbarovna, I. S. (2023). TALABA YOSHLARDA MAFKURA TUSHUNCHASI VA MAFKURAVIY IMMUNITETNI SHAKLLANTIRISH.
28. Akbarovna, I. S. (2023). O'SMIRLARDA DESTRUKTIV AXBOROTLARGA NISBATAN MAFKURAVIY IMMUNITET SHAKLLANTIRISH.
29. Akbarovna, I. S. (2023). DESTRUKTIV AXBOROTLARGA NISBATAN MAFKURAVIY IMMUNITET SHAKLLANTIRISH IJTIMOIIY MUAMMO SIFATIDA. Barqaror Taraqqiyot va Rivojlanish Tamoyillari, 1(6), 26-29.
30. Akbarovna, I. S. (2023). MILLIY HARAKATLI O'YINLARNING BOLALAR TARBIYASIDAGI IJTIMOIIY-PSIXOLOGIK XUSUSIYATLARI.
31. Sitara Akbarovna Ikromova. (2023). Formation of Ideological Immunity to Destructive Information. Intersections of Faith and Culture: American Journal of Religious and Cultural Studies (2993-2599), 1(9), 50-54.
32. Akbarovna, I. S. (2023). Study of the Formation of Ideological Immunity By Foreign and Russian Researchers. American Journal of Public Diplomacy and International Studies (2993-2157), 1(9), 235-239.
33. Akbarovna, I. S. (2023). Adolescence during Destructive Behavior Appearances the Problem Learning Condition. Intersections of Faith and Culture: American Journal of Religious and Cultural Studies (2993-2599), 1(9), 105-109.
34. Ikromova, S. A. FACTORS IN THE DEVELOPMENT OF IMMUNITY TO DESTRUCTIVE IDEAS IN ADOLESCENTS.
35. Akbarovna, I. S. (2023). RESEARCH METHODS OF YOUTH PSYCHOLOGY. International Multidisciplinary Journal for Research & Development, 10(12).
36. Ikromova Sitara Akbarovna. (2023). NEUROPHYSIOLOGY BASIS OF HORMONES. TECHNICAL SCIENCE RESEARCH IN UZBEKISTAN, 1(5), 68-77.

VOLUME-1, ISSUE-5

37. Akbarovna, I. S. (2023). Formation of Ideological Immunity to Destructive Information in Adolescents. *American Journal of Public Diplomacy and International Studies* (2993-2157), 1(10), 119-122.
38. Qazoqov, J. R. (2023). RESEARCHING AUTOMATION OF LIGHTING SYSTEM OF BUILDINGS. *Journal of new century innovations*, 23(2), 35-39.
39. Сайфуллаева, Н. Б. (2020). Важные особенности дидактических игр в процессе обучения математике в начальных школах. In *ИННОВАЦИОННЫЕ МЕТОДЫ ОБУЧЕНИЯ И ВОСПИТАНИЯ* (pp. 60-62).
40. Сайфуллаева, Н. Б., & Мурадова, Я. М. (2020). Пути эффективного использования методов обучения математике в начальных классах. In *EUROPEAN RESEARCH* (pp. 121-123).
41. Сайфуллаева, Н. Б. (2022). Методы определения потребностей обучающихся в процессе использования облачных технологий в образовании. *Universum: технические науки*, (2-1 (95)), 57-59.
42. Сайфуллаева, Н. Б., & Саидова, Г. Э. (2019). Повышение эффективности занятий, используя интерактивные методы в начальном образовании. *Научный журнал*, (6 (40)), 101-102.